

Flip Me! Slide Me! Glide Me!

Objective:

Students will plot points and polygons on the coordinate plane. Students will do transformations such as flips, slides, and glides.

Skills Developed:

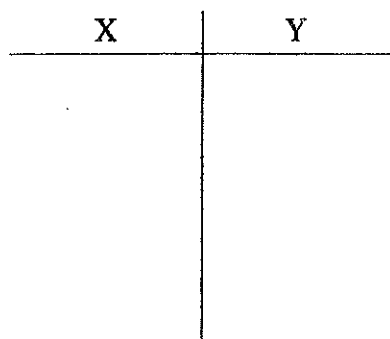
Use the graph window to explore the four quadrants of the coordinate plane. Use the Draw menu in interactive mode. Build lists of ordered pairs to draw polygons using xy-line plot.

Materials Needed:

- TI-82 or TI-80 graphics calculator
- geoboards or dot paper

Activity:

1. Draw the Cartesian plane on graph paper. Practice graphing ordered pairs in the different quadrants.
2. Use the integer window to discover relationships of the x's and y's in the different quadrants. (First quadrant x's are positive, y's are positive; quadrant 2 x's are negative, y's are positive, and so on)
3. Use four geoboards to make the Cartesian plane. Use a geoband to make a polygon in the first quadrant. Identify the ordered pairs for the vertices. Record the ordered pairs onto an xy T-Chart.

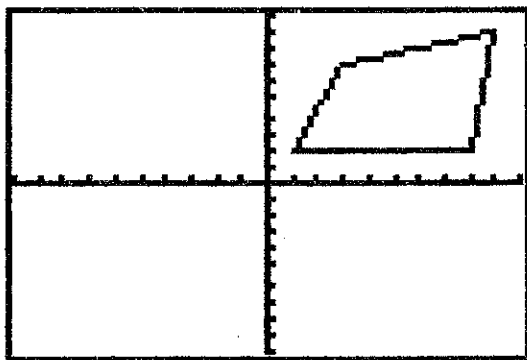
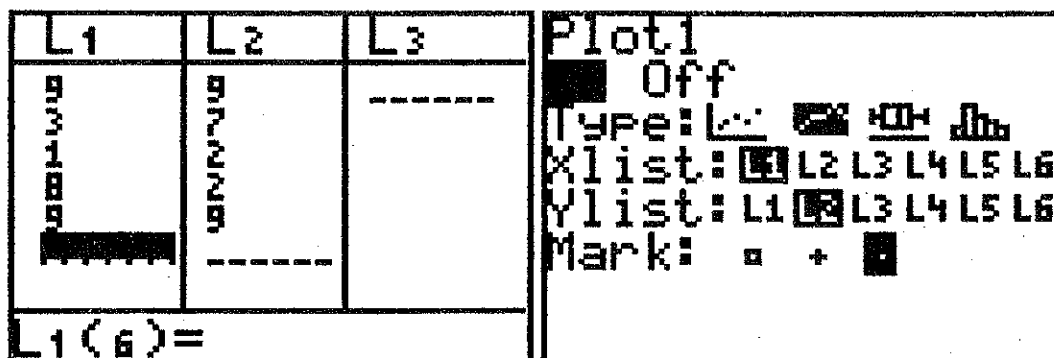


4. Build an identical polygon in the second quadrant using the same y values. Record the ordered pairs onto an xy T-Chart.
 - If you keep these same y values, how many different identical polygons can be built in first and second quadrants? Describe what has happened to the values of x and y as you move the polygon.
5. Now repeat this activity moving the polygon to the third and fourth quadrants. Re-

cording the ordered pairs for the vertices each time on an xy T-chart.

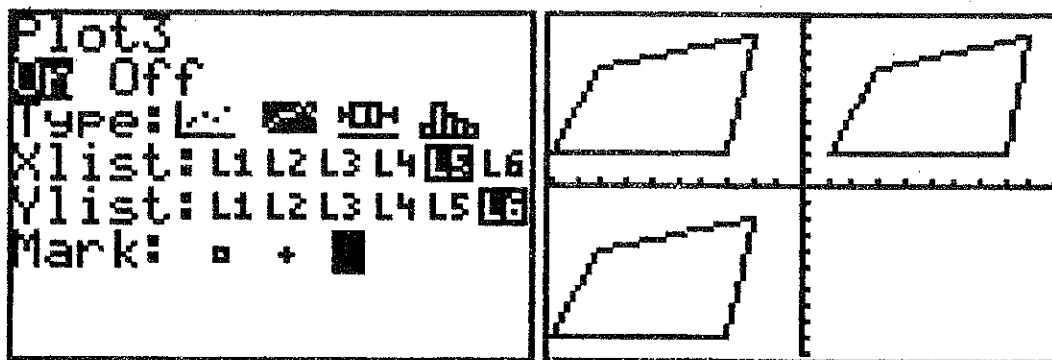
- Describe what has happened now.

- Repeat activities 3,4, and 5 using graph paper.
- Write down what has happened to the x and y values as we have moved the polygon from quadrant to quadrant. Include any patterns you may see.
- Enter the values from your first t-chart into the lists of the TI-82 You need to enter the first pair as the last pair also in order to have the calculator draw the completed polygon. A sample list of ordered pairs is shown. L_1 is the x coordinate and L_2 is the y coordinate of the ordered pairs. Set up the STATPLOT as shown. Graph the figure using a standard window.

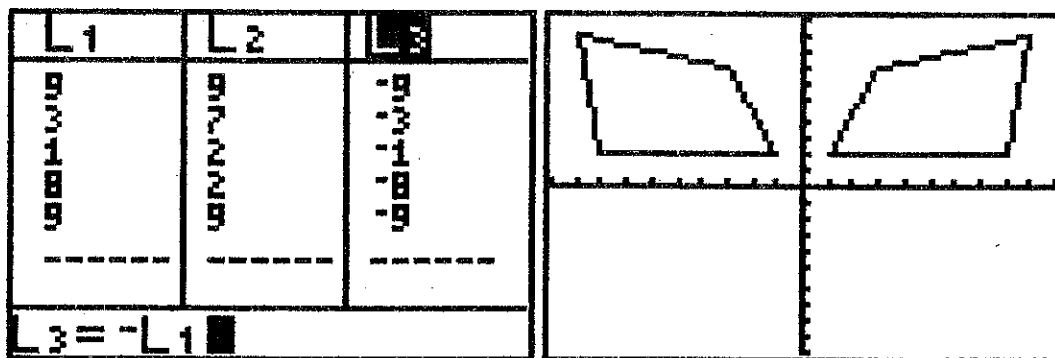


Why is the first and last (x,y) the same?

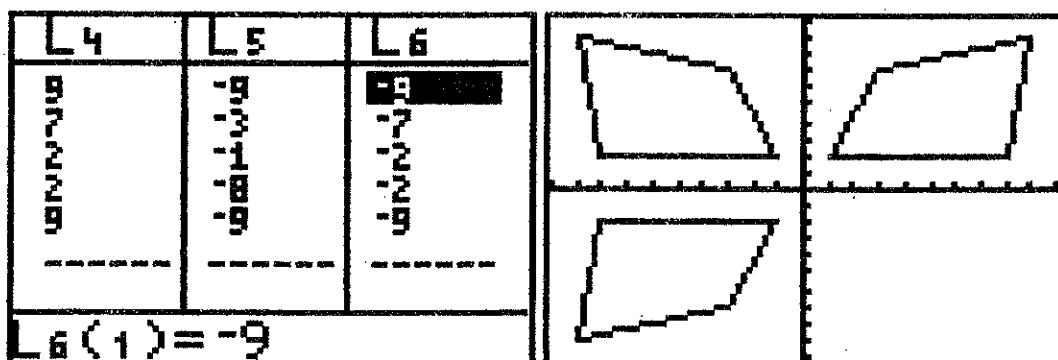
- Ask the students how you could move the figure from the first quadrant into the second quadrant. Discuss and have the students experiment by changing the x value and storing it in L_3 as shown. The students have had experience on geoboards and graph paper before so they should know to subtract from the value of x to move the figure. Have them also enter the y values from L_2 into L_4 as shown.



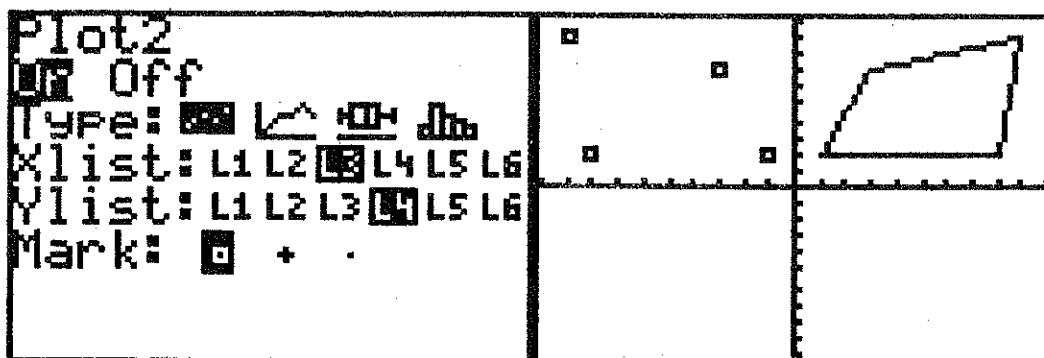
13. Now for the flip. Go to the **STAT** menu and take the negative value of L_1 as shown below. Enter the same values in L_4 as are in L_2 .



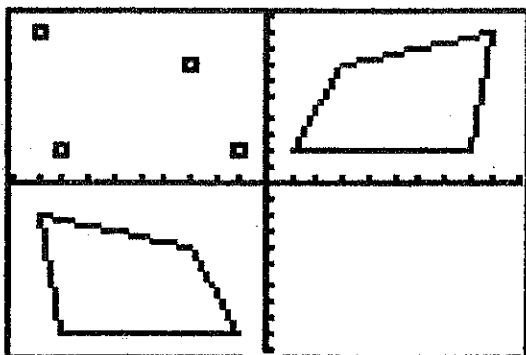
14. To flip the quadrilateral to quadrant 3, copy L_3 into L_5 . L_6 is the negative value of L_4 .



15. To glide a figure start in quadrant 1. Flip the figure to quadrant 2 by taking the negative values of L_1 and place in L_3 . Copy L_2 to L_4 . Plot as shown below.



16. Slide the figure to quadrant 3 by taking the x-values from L_3 and placing them in L_5 . Take the y-values from L_4 and subtract 11 and place them in L_6 .



Related Activities:

1. Have the students do each of the above activities with a polygon that has a different number of sides.
2. Have the students decide how to rotate a figure.
3. Have the students do the above activities using figures with intersecting lines or using concave figures.
4. Have the students shrink or enlarge the figure.

Writing Activities:

1. Have the students explain how to tell whether the x or the y values will change.
2. Have the students explain why you take the opposite of the x or y values.
3. Explain how to show the transformed figures are congruent.
4. Explain how to show a sized figure is similar.